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CFTRI MYSORE

Textile Technology Conference of ATIRA, BTRA and SITRA

The 18th technological conference sponsored jointly by the Ahmedabad Textile Industry's Research Association (ATIRA), the Bombay Textile Research Association (BTRA), and the South India Textile Research Association (SITRA) was held at Bombay on 3 and 4 February 1977. BTRA hosted the conference in which as many as 1000 delegates, including some from Sri Lanka and Kenya, participated.

The conference comprised 17 technical sessions at which 36 papers presented by nine organizations covered almost all the major areas of interest.

The sessions in mechanical processing dealt with : efficiency of blowroom cleaning of cottons, optimum conditions for combing, ring frame modifications to reduce frame vibration and productivity, conditions to reduce roller lapping at ring frames, and sizing and waxing conditions for improving weaving and knitting performances. A new subject dealt with was the spinning of jute and cotton-jute blends. Dynamic studies on the loom parameter and fabric engineering and design were also discussed.

The chemical processing sessions dealt with various aspects of resin finishing, dyeing with reactive dyes, and ways and means to reduce sodium hydrosulphite consumption in vat dyeing.

The production of high-tenacity cotton yarns by mercerization, imparting textured appearance by selection of proper twists with folded polyester blend yarns, improvement of fabric properties by using partially covered cotton yarns, etc. formed part of the textile physics sessions. Other subjects dealt with morphological characteristics and differential friction in cotton fibres, sampling schemes, static charge accumulation in textiles and the nature of physical damage to cotton fabrics during wet processing.

The engineering sessions covered modifications to materials handling equipment in mechanical processing departments to improve efficiency; engineering aspects of rings; and methods to reduce the cost of space heating in spinning and weaving departments of mills. A theoretical model for thin bed drying, applicable to contact, convection and dual drying was also presented and discussed.

A general paper on the application of variance analysis as a managerial control tool for estimation of variation of actuals to budgeted expenditures and/or inputs was presented.

An exhibition on the developmental activities of BTRA was also organized on the occasion for the benefit of the participants and delegates.

Shri Balkrishna Harivallabhdas, chairman of the Indian Cotton Mills' Federation, who inaugurated the conference exhorted the textile technologists to evolve short-term measures to help the textile industry to combat the unprecedented crisis and also to work out long-term measures to ensure that such conditions do not recur. Shri Kantikumar R. Podar, chairman of the Millowners' Association, Bombay, brought out, in his address, the benefits derived by the industry in productivity and cost due to the wide spectrum of activities of BTRA, and suggested further work in conservation of steam, water and fuel, and in tackling the problem of air and water pollution. The chairman of BTRA, Shri Radhakrishna R. Ruia, highlighted the contributions made by BTRA for the benefit of the industry. He said that the setting up of a demonstration model of BTRA's electrolytic process for vat dyeing in West Germany was symbolic of the capabilities of the research associations for exporting know-how even to the advanced countries.

Spinners-Knitters Get-together and SITRA's 14th Technological Conference

A get-together of spinners and knitters and the 14th technological conference of the South India Textile Research Association (SITRA), Coimbatore, were held on 22 and 23 January 1977. About 450 delegates including about 100 knitters from various knitting centres like Belgaum, Calcutta, and Tirupur participated in the conference. Ten research papers in knitting and allied subjects were presented at the conference and recommendations were made.

Inaugurating the conference, Prof. Y. Nayudamma, Director General, Scientific & Industrial Research, appreciated the work done by SITRA in the field of knitting technology which was an unexplored field. He said that scientists should base their work on the resources available in the country and also the culture. The work should be culture specific and resource specific and the scientists should not

try to imitate the technology suitable for developed nations. He added that India ranked third in the world in trained manpower resources which could be utilized for further advance in science and technology.

A display of the various knitted garments manufactured with the existing knitting machines was also arranged. About one hundred knitted garments manufactured at SITRA on circular, flat and warp knitting machines were displayed.

Prof. Nayudamma also gave away awards to some of the staff of SITRA for outstanding work during the last five years.

The first three papers dealt with knitting technology. N. Ramani, in his paper, dealt with the desirable quality characteristics of spun yarn for knitting. Tracing the reasons for yarn breakage during knitting, he said that the main areas to be considered for improvements in spun yarns were yarn preparation, yarn treatment and machine modifications.

K. S. Shankaranarayana, in his paper, said that waxing of yarns reduced breakages in knitting. He also examined critically the method of waxing at present used by spinning mills and made certain specific recommendation for increasing efficiency.

The third paper presented by G. Padmanabha Prasad gave a concise account of batchwise scouring and bleaching processes of the knitted goods. It dealt not only with the details of procedure but also the quality control measures to obtain a good bleaching of knitted goods. Since the fabric transportation is important when dealing with the knitted goods, stress was laid on handling the material during processing.

The next two papers dealt with combing of cotton. V. Sriramulu, in his paper, studied the effect of initial fibre length uniformity ratio in relation to top comb penetration, detachment setting and timing of combing by comber cylinder with reference to feed. The results of this study will help in fixing the optimum waste to be extracted on the comber from initial fibre length characteristics. The second paper by K. N. Seshan presented the data gathered on six cottons each spun to different counts of both carded and combed yarns at two levels of waste extraction, and showed that the equation developed earlier for carded counts relating yarn unevenness with fibre properties holds good for combed counts also.

There has been some criticism that Indian mills have been over-spinning their cotton and this has resulted in poor yarn quality. The paper by (Miss) Indra Doraiswamy examined how far the poor quality of yarn is due to cotton used on the one hand and the machine factors on the other.

The influence of mercerization under different conditions on the tensile properties of cottons was the subject matter of the paper by K. P. Ramakrishna Pillay. Mercerization in two stages rather than in one has been found to give satisfactory results. The possibility of using the above knowledge for development of a machine for continuous mercerization of single yarn has also been investigated.

V. R. Siva Kumar, in his paper, studied the structure of pills and the nature of fibres that go into the formation of pills. An analysis of the conditions giving rise to pilling has also been carried out. It was observed that processes like singeing and heat setting substantially reduce the pilling tendency.

In the last paper presented by K. Ranganathan, SITRA's services to the decentralized powerloom sector were highlighted.

International Symposium on Rapeseed and Mustard at CFTRI

The Joint Indo-Swedish Commission on Science and Technology has chosen the study of rapeseed and mustard for better utilization of the oilseed as one of the areas for collaboration between India and Sweden. Both India and Sweden are major growers of rapeseed/mustard. In India nearly 3.5 million hectares are under cultivation of mustard and the annual production is about 2.2 million tonnes. Sweden has achieved very high yields of rapeseed—2.6 tonnes per hectare. Rapeseed oil is important for the production of margarine. Although the oil finds ready use, the cake left after the extraction of oil does not find extensive use as a food or a feed. This is because rapeseed/mustard contain some anti-nutritional factors which need to be eliminated before the cake can be rendered edible. The cake contains good-quality proteins and thus can be a valuable source of proteins for both feed and food purposes. Sweden has made rapid strides in developing high yielding varieties of rapeseed and also varieties which are low in undesirable constituents. In India, attempts have been made to evolve high-yielding, frost- and aphid-resistant varieties of mustard. Also, processes have been developed in both the countries to detoxify the cake to make it edible.

To share the experience gained by the Indian and Swedish workers, an international symposium on rapeseed and mustard was organized under the auspices of the Department of Science and Technology, New Delhi, at the Central Food Technological Research Institute (CFTRI), Mysore, from 22 to 24 November 1976. Forty scientists and technologists from Sweden, Canada and India participated in this symposium, which was inaugurated by Dr A. Ramachandran, secretary, Department of Science and Technology. Various aspects such as agricultural production technology, chemistry, nutrition and processing of rapeseed and mustard were discussed in five scientific sessions. In the concluding session, specific recommendations for collaborative research between India and Sweden were drawn up; these will form the basis for a Indo-Swedish collaborative research programme in the area of rapeseed/mustard.

31 AUG 1978
C.F.R.I., MYSORE

Exhibition on Optical and Allied Industries : CGCRI's Participation

The Central Glass & Ceramic Research Institute (CGCRI), Calcutta, participated in the exhibition on optical and allied industries organized by the Optical Society of India (OSI) at the University College of Technology, Calcutta, from 31 January to 3 February 1977. The exhibition was organized on the occasion of OSI's symposium on 'Optical Instruments and Techniques'. CGCRI displayed various types of special glasses like laser glass, IR and UV transmitting glasses, prescription ophthalmic glasses and optical glasses in the exhibition.

VITM's State-level Science Fair

The Visvesvaraya Industrial & Technological Museum (VITM), Bangalore, in coordination with the Department of State Educational Research & Training (DSERT), Bangalore, organized the 1977 Karnataka state-level science fair from 18 to 22 January 1977. The novelty of this science fair was that merited schools from all the four educational divisions of Karnataka, where divisional-level science fairs were held during 1976, were invited to participate. Sixty-three schools from 18 districts of Karnataka and 16 schools from Bangalore took part in the science fair.

Special demonstration-cum-training programmes relating to clay moulds and casts, food adulteration, and identification and detection of minerals were arranged for the participating students. An evaluation programme was arranged for the benefit of the participating teachers. The Dynam Engineering Corporation, Bangalore, demonstrated their different types of science kits to the teachers. Apart from the nine prizes and scholarships awarded by VITM and DSERT, twelve prizes of Rs 100 each were also awarded to the young scientists by some members of the public. The Educator Manufacturers Association of Bangalore awarded a special trophy to one of the students for his exhibit.

Nearly 235 exhibits were displayed at the fair. These exhibits were handled and demonstrated by 158 participants. The fair attracted more than 25,000 visitors.

CMRS Develops Dust Collector

The Central Mining Research Station (CMRS), Dhanbad, has designed and developed a dust collector for collection and disposal of fine dust particles produced during drilling. This instrument collects over 99% of dust produced during drilling in a collector bag. The bag can be emptied easily at a convenient place after a complete set of holes is drilled.

The instrument is simple in design, portable, sturdy and very easy to operate. Even an unskilled worker can operate it. The device can be manufactured completely from indigenous material. The manufacturing cost of the device is reasonable.

With the development of this instrument, workers have no longer to expose themselves to airborne dust generated during drilling. In present-day coal mining, blasting-off-solid is practised increasingly and in this process a large number of holes is drilled. This poses dust hazard at mine faces and return airways. The new development can go a very long way in containing the hazards of dust to mine workers. It is also useful in metal mines where compressed air drilling is practised. The device has export potential also.

NAL Develops Interactive Display Terminal

An interactive display terminal, which is an input-output unit generally used to improve the efficiency of man-computer communications, has been developed by the National Aeronautical Laboratory (NAL), Bangalore. This unit finds applications in display of critical parameters during a process; as a versatile input/output unit in computer systems for software development and debugging; and in displaying general information at air and rail terminals.

The unit permits the user to obtain connections quickly and conveniently with the central processing unit. This could be achieved either directly or through data transfer lines. As compared to mechanical devices, its important advantage is the noiseless running and unlike the peripherals using tapes and cards, there is no need for intermediate carriers.

The specifications of the interactive display terminal are :

Screen size	: 19 in. diagonal
No. of character lines	: 16
No. of characters/line	: 32
Memory capacity	: 4096 words of 6 bits each
Refresh frequency	: 50 Hz
Character format	: 5×7 dot matrix
Code system	: ASCII
Character set	: 26 alphabets (upper case); 10 numerals; 28 symbols
Text editing	: erase of display; erase to end of line; roll up/down; movement of curser in four directions
Operating modes	: on line, off line.

Pollen Spore Teaching Aid Kit : NBG

The National Botanic Gardens (NBG), Lucknow, has produced a pollen spore teaching aid kit for the benefit of the teachers and students of botany in universities and colleges. The kit (price, Rs 75) contains 22 slides, representing the structural types of pollen grains and spores, a perusal of which would provide knowledge on the fundamentals of pollen spore morphology. Further particulars can be had from the Director, National Botanic Gardens, Rana Pratap Marg, Lucknow 226001.

Orbital Mechanics and Related Aerospace Problems

Shri N. Rajappa of the National Aeronautical Laboratory, Bangalore, was awarded Ph.D. degree by the University of Madras for his thesis based on the investigations he carried out on orbital mechanics and related aero-

space problems. He worked under the guidance of Prof. K. S. Viswanathan, Head of the Physics Department, University of Kerala, Trivandrum.

The primary investigation was concerned with the development of a new theory for the motion of satellites which orbit around a nearly spherical body under its gravitational attraction. The need for a new theory arose from the various difficulties encountered by the existent theories for the motion of artificial satellites around the earth. The newly developed theory has several merits. It is valid for all arbitrary initial orbital configurations of the satellite, including nearly circular, nearly equatorial and the so-called 'critical' inclination (63.4°) orbital configurations. The same choice of elements is used for all orbital configurations. The theory applies equally well for treating non-conservative perturbing force field systems (e.g. atmospheric drag).

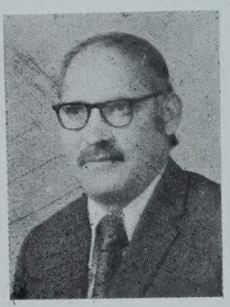
The secondary investigation related to an extension of Stormer's theory of charged particle motion in earth's dipole magnetic field, to take into account also the contribution of the field due to surface currents on the magnetopause; the model proposed by Mead was used for cavity field. The attention centred predominantly around the region of the inner magnetosphere where the axially symmetric part of the total field decides overwhelmingly the structure of charged particle motion.

An extension to Stormer's integral was derived in terms of a new parameter *m* (replacing Stormer's integration constant—gamma) which classified the particles in accordance with the value of the component of their angular momentum about the earth's dipole axis prior to their injection into the magnetospheric cavity through regions of weak magnetic field. It was observed that the particles populating the Van Allen radiation zones had *m* values in the range 5-9, while the auroral electrons were characterized by very low values of *m*. Calculations carried out to compute magnetic cut-off latitudes for low-energy solar protons, however, showed the serious inadequacy of the Mead's model of the cavity field and the need to take into account also the contribution of the magnetic field due to the magnetospheric tail.

NATURAL PRODUCTS AND THEIR BIOSYNTHESIS

Bhatnagar Prize-winner Dr Bhakuni's Work

Dr D. S. Bhakuni has made significant contribution to several aspects of natural products chemistry. He has systematically examined a large number of indigenous medicinal plants for biological activity and has isolated several biologically active compounds from them. The structure, stereochemistry and absolute configuration of these compounds have been determined. His studies have uncovered biological activity in a number of new natural products. Some of these structures have given new leads for obtaining potent drugs. He has also achieved biogenetic type of synthesis of morphine, proaporphine and aporphine alkaloids and has made notable contributions to chemo-taxonomy of plants. He has also investigated plants and animals from marine source.



Dr D. S. Bhakuni

Dr Bhakuni has been one of the pioneers in the country in the field of alkaloid biosynthesis and has made outstanding contributions in this area. Tracer experiments with optically active coclaurines demonstrated specific incorporation of (+)-isomer into crotonosine. The evidence obtained supported the view that oxidative cyclization of (+)-coclaurine to a dienone is involved. Double labelling experiments involving the methoxy group of coclaurine showed that most, but not all, of the methoxy activity was lost in conversion into crotonosine. Using labelled precursors the relationship between the 1-benzylisoquinoline and the aporphine alkaloids have been studied. The relationship between mecambrine and roemerine has been demonstrated. The results as a whole provide support for the hypothesis that aporphine alkaloids of the anonaine-roemerine type are derived from coclaurine type precursors through phenol oxidation. Dienone of the crotonosine-mecambrine types are intermediates. Specific utilization of (+)-reticuline into boldine has been demonstrated. The evidence supports the direct oxidative coupling of (+)-reticuline to isoboldine which in turn is shown to be a specific precursor of boldine. Feeding experiments showed that dopa contributes only to the formation of the phenethylamine portion of reticuline and the benzylic portion is biosynthesized from 3, 4-dihydroxyphenylpyruvic acid not derived from dopa. Further, there is no selectivity of O-methylation in the biosynthesis of reticuline. However, N-methylation of norreticuline is a stereospecific process.

Although papaverine does not possess an asymmetric centre, enzymatic reactions are generally stereospecific and one can expect that either of the enantiomers of norreticuline would be the true biological precursor of papaverine. Indeed, when (−)- and (+)-norreticulines were fed to *Papaver somniferum* plants, papaverine was exclusively biosynthesized from (−)-norreticuline. Tracer experiments demonstrated that both the abnormal *Erythrina* alkaloids cocculidine and isococculidine were specifically derived from norprotosinomenine via dibenz-(*d*, *f*) azonine intermediates. Feeding with (+)- and (−)-norprotosinomenine demonstrated that the stereospecificity was maintained in the biosynthesis of these bases. Feeding labelled precursors to *Croton sparsiflorus* plants showed that crotsparine, dihydrocrotsparine and sparsiflorine were specifi-

Dr Dewan S. Bhakuni of the Central Drug Research Institute, Lucknow, has been selected for the Shanti Swarup Bhatnagar Prize in chemical sciences for the year 1975 (jointly with Prof. A. Chakravorty) [*CSIR News*, **27** (1977), 17].

cally biosynthesized from coclaurine. Cocsulin, a representative of bisbenzylsoquinoline alkaloid, has been shown to be specifically biosynthesized by oxidative dimerization of (+)-N-methylcoclaurine. During this biotransformation one of the methoxyl groups from the precursor is expelled to form the dioxane bridge.

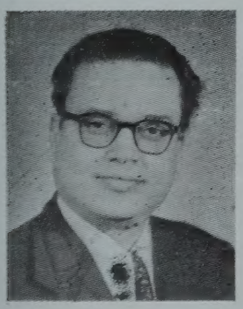
Dr Bhakuni has to his credit about 100 research papers and a number of reviews.

FACETS OF TRANSITION METAL CHEMISTRY

Bhatnagar Prize-winner Prof. Chakravorty's Work

Prof. A. Chakravorty and his coworkers have made notable contributions to several contemporary aspects of transition metal chemistry freely using a wide variety of physical techniques. His work covers synthesis, structure and dynamics.

Prof. Chakravorty's work on isotropic pmr contact shifts in 4-, 5- and 6-coordinate paramagnetic nickel(II) systems derived from salicylaldimines and triazene 1-oxides is well known. Some of the systems exhibit stereochemical nonrigidity and ligand exchange equilibria. Studies of contact shifts have led to (i) detailed understanding of the nature and magnitude of the delocalization of unpaired electrons on to the ligand frame, and (ii) thermodynamic characterization of nonrigidity and ligand exchange processes. The pmr technique was also cleverly used for unequivocal symmetry and isomer identification of rigid MB_3 systems where B is an unsymmetrical bidentate ligand. In many systems only the meridional isomer has been shown to exist due to steric effects.



Prof. A. Chakravorty

Prof. Chakravorty showed for the first time that because of the smallness of energy difference between planar and tetrahedral forms, salicylaldimines of nickel (II) can be grown with predetermined stereochemistry in different crystalline environments. His works on the complexes of triazene 1-oxides have demonstrated that an aromatic halo group when suitably placed in a ligand frame can bind metal ions. This interaction designated 'halo-coordination' is weak but it profoundly influences magnetic and spectroscopic properties of metal complexes. The arylazooximates of transition metals have been shown to have a fascinating chemistry: (i) octahedral *tris* complexes of iron (II) which bind alkali metal ions via oxime oxygen with consequent solubilization in non-polar organic solvents, (ii) dimeric completely diamagnetic copper (II) systems, and (iii) halogen bridged Pd(II) and Pt(II) complexes which undergo a variety of dynamic bridge-splitting and chelate opening reactions. Using the simple but virtually unexplored idea that the system M (bidentate) (tridentate) should be pentacoordinated, Prof. Chakravorty has contributed to the general area of design and structural characterization of pentacoordination. Variations of the ligand systems revealed interesting reactivity patterns: adduct formation, dimerization and stereochemical equilibria such as the aquation of a square pyramid to an octahedron. Prof. Chakravorty has done thermodynamic characterization of a variety of stereochemical equilibria.

In magnetic exchange, an area of considerable current interest, Prof. Chakravorty's work relate to exchange phenomena in dinuclear and trinuclear copper (II) systems. Using imine-oxime ligands, new classes of systems have been obtained. Particular mention should be made of species having the Cu_3 or Cu_3O core with sole population of the spin-doublet ground such state. The problem is studied both experimentally (bulk susceptibility and epr) and theoretically (molecular orbital methods).

Electron transfer processes pervade today's chemistry. Using simple ideas such as the electroneutrality principle and the predictive powers of ligand field theory, Prof. Chakravorty has shown how highly oxidized states of nickel can be made very stable in combination with certain kinds of ligands. Even more important than this are his studies on the redox behaviour of these and related systems. For such studies a precision solid state cyclic voltametric apparatus has been fabricated in Prof. Chakravorty's laboratory using indigenous components. Cyclic voltametric studies have led to the identification and understanding of (i) the passage of a multielectron process into discrete one-electron steps, (ii) electron transfer reactions which are coupled with proton transfer, (iii) rate processes concerning electron transfer and chemical reactions following electron transfer, and (iv) the possible pathway of electron transfer. Regarding (ii), experimentally only the coupled step is observed, but the thermodynamic parameters can be reconstituted from separate electron transfer and proton transfer contributions. Coupled reactions of this type are believed to play important roles in biochemical reactions. Prof. Chakravorty has been continuing his work on electron transfer reactions in metal clusters and in model molybdenum systems.

Prof. A. Chakravorty, head of the Department of Chemistry, Indian Institute of Technology, Kanpur, has been selected for the Shanti Swarup Bhatnagar Prize in chemical sciences for the year 1975 (jointly with Dr D. S. Bhakuni) [*CSIR News*, 27 (1977), 17].

PROGRESS REPORTS

CEERI Annual Report: 1975

The annual report of the Central Electronics Engineering Research Institute (CEERI), Pilani, for the year 1975, has been brought out. The report (mimeographed) shows that the institute continued its activities in R&D programmes on major projects of interest to user departments and industry. The insti-

tute had on hand 20 projects of which 8 were in the final phase. Four of these projects were multi-institutional in nature. Electronic equipment and vacuum tubes were batch-produced for actual users like the Railways and the Defence. The programmes identified by the Department of Electronics, National Committee on Science and Technology and the coordination council of the physical and earth sciences laboratories of CSIR were given priority and efforts were made to adhere to the time targets.

During the period under review, three magnetrons were fabricated, processed and tested. All of them gave satisfactory performance. Extensive testing, including plotting of Rieke diagrams, was done on the tubes. It was possible to lower the resonant frequency of the anode blocks according to the requirement of the users.

In connection with an inter-laboratory project, two RF heaters (3 kW, 450 kHz and 1.2 kW, 13 MHz ratings) were designed, developed and tested. One 13 MHz unit was handed over to the Madras extension centre of the National Metallurgical Laboratory. Design work on 5 kW and 12.5 kW RF heaters was completed.

A number of batches of two types of electronic flash tubes—of 500 joules for laser pumping, and dc short arc tubes of 200 W for portable search lights, etc.—was fabricated and tested. The techniques were improved and a high yield of over 60% was obtained. Power supplies and test equipment for these tubes were designed and fabricated so as to minimize the foreign exchange requirement. A circuit for a solid state automatic (computerized) flash gun which gives the right quantum of light output as required for the object to be photographed, taking into account its distance, reflectivity, etc., was designed. The initial experiments on quartz seals for high power tubes were encouraging.

An electron microscope JEM 100 B was commissioned and tested for satisfactory operation.

Work of correlating the important parameters of power transistor such as collector current, break-down voltage, current gain and cut-off frequency with physical parameters like impurity profile, junction depth and surface geometry was completed. The microwave varactors designed in the laboratory worked up to 6 GHz and tuning varactors with capacitance ratio of more than 8 within a range of 40 V were also made. Design and development of double drift impatt diode having n^+npp^+ and p^+pnn^+ structures were completed by the usual diffusion techniques. Design and development of a 4 GHz broad-band parametric amplifier were taken up during the year.

Assessment of the previous year's R & D activities led to the concentration of efforts on the design of a 12-step 3-phase thyristor inverter using auxiliary impulse commutation for the single-to-three phase thyristor converter system for the WAM 4 electric locomotives of the Indian Railways.

In the field of point-to-point communications, design of 100 mW and 500 mW citizen band transreceiver (walkie-talkie) was finalized and prototype units were tested and approved by the Chief Inspectorate of Electronics, Ministry of Defence. Investigations on propagation of signal through earth's crust were initiated.

In audio engineering, the IC version of the 16-channel vocoder was completed, a new pitch detector circuit was designed, and six coder-decoder units for audio-visual system III were fabricated and assembled.

A fully transistorized prototype language master, useful in associating drawings on a card to the words recorded in a tape, was designed and fabricated. A stereo cassette tape recorder was also designed and assembled. The know-how on the half-track tape head was released to a small-scale industry in Hyderabad.

In industrial engineering, the batch production unit completed the production of 70 units of test equipment, worth about Rs 2.10 lakh, for testing various cards of the diesel electric loco speed controls developed in the institute. A batch of VHF wobbulators was also produced. A batch each of two vidicon TV cameras and six citizen band transreceivers was produced. The Metal Finishing section developed techniques such as: nickel plating over moly-manganese mixture over ceramic; electroless copper plating over thin evaporated aluminium with fairly good adhesion; gold plating on evaporated titanium-gold silicon; metallizing of ceramic with electroless copper with fairly good adhesion; and rivelling type of paint, hitherto available only in imported equipment.

Six processes relating to citizen band transreceiver, de-soldering bits for IC packages, 16-bit fractional bianary to decimal converter, VHF attenuator, ceramic IF filter, and vibration pick-up were assigned to the National Research Development Corporation (NRDC) of India for commercial exploitation and six other processes were released to industry through NRDC. Twelve processes/products went into production. Thirty-three papers were published and eight patents were filed/accepted/sealed.

CSIR SUPPORT TO RESEARCH

Completed Schemes

Anatomy and Chemistry of Fish Muscle

A study on some aspects of the anatomy and chemistry of fish muscle was made by Shri Saleem Mustafa (a CSIR research fellow), under the guidance of Dr S. Mashhood Alam, Head, Department of Zoology, Aligarh Muslim University, Aligarh. A brief account of the study is presented below.

Maturation of cat-fish, *Clarias batrachus*, was accompanied by a steady increase in the concentration of DNA and decrease in the concentration of

RNA in the skeletal muscle. The apparent rise in DNA concentration could be the side-effect of depletion of body tissues rather than the result of its actual synthesis. The phenomenon of 'gene de-repression' did not seem to be involved in the process of maturation.

Concentration of phosphorus in the body tissues during the growth of the fish was found to be related to feeding and maturation cycles. This constituent increased with increased food intake. There seemed to be a transfer of phosphorus towards gonads during the maturation process.

The solubility of muscle protein in neutral salt solutions was studied. The solubility decreased with increase in the proportion of connective tissue septa (myocommata). Thus, it was low in the trunk region, and declined with growth, as the proportion of myocommata increased. The protein solubility was also found to decrease during the process of starvation since depletion of cellular constituents caused shrinkage of the muscle cells and this brought the myocommata in close proximity.

Studies were made on some physical properties like specific gravity, viscosity, fluidity and surface tension of the muscle lipid of two common freshwater teleosts *Ophicephalus striatus* and *Clarias batrachus*. The specific gravity of the muscle lipid was higher in the case of *C. batrachus* (0.947) than in *O. striatus* (0.894). The specific gravity of the lipid of both the species was, however, lower than that of water. The viscosity of the lipid of the cat-fish (7.576) was higher than that of the murrel (5.190). The fluidity was inversely related to the viscosity since it was higher in the murrel (0.192) than in the cat-fish (0.131.) The surface tension of the muscle lipid was observed to be greater in *C. batrachus* (25.083) than in *O. striatus* (12.058).

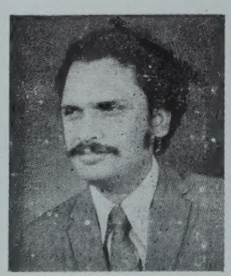
Depot fats of some economically important freshwater fishes were analyzed to study some of the chemical properties. The effect of heat treatment on the moisture and volatile matter in the lipids, including the correlation between volatility and thermally induced calorific loss, was also investigated. The concentrations of moisture and volatile matter varied with the species. The two constituents were least concentrated in *Rita rita* (4.650%) while their concentrations were highest in *Ophicephalus punctatus* (13.635%). The percentages of these constituents were 7.278 and 8.965 in *Heteropneustes fossilis* and *Wallagonia attu* respectively. The loss in the calorific value of fish lipids seemed to depend upon the degree to which they were volatile. Thus, the loss in the calorific value during heat treatment of the depot fat of *O. punctatus* with high volatile matter was greater than that in *Rita rita* with low volatility. This phenomenon has been discussed in the light of available evidence revealing that drying of lipids during various technological processing leads to a substantial loss in the quantity of more volatile fractions such as short-chain fatty acid methyl esters and some of the short-chain fatty acids.

PERSONNEL NEWS

Appointments/Promotions

Prof. K. S. Rao

Prof. K. S. Rao has been appointed Scientist F in the Central Salt & Marine Chemicals Research Institute (CSMCRI), Bhavnagar, with effect from 2 February 1977. Prof. Rao (born 15 Oct. 1935) had all his collegiate education from the Andhra University (B.Sc., 1956; M.Sc., 1957; and Doctor of Science, 1963). He was awarded Dr N. S. Subbarao memorial prize for standing first in the whole of M. Sc. class in 1957.



Prof. Rao served at Andhra University; Regional Engineering College, Warangal; and Birla Institute of Technology and Science (BITS), Pilani, as faculty member. He was the head of the Chemical Engineering Department at BITS for about eight years and organized the under-graduate and post-graduate programmes. He was invited to M.I.T., Cambridge, USA, as a visiting professor during 1968-69.

Prof. Rao's interests include mass transfer, solar energy utilization, environmental control, modelling and simulation, and computer aided design. He was the project leader of the low temperature solar thermal processes group at BITS and developed several types of solar water pumps.

He was also principal investigator and coordinator for the inter-disciplinary ecological studies in and around Khetri in view of the effect of establishing a large copper and fertilizer industrial complex.

Prof. Rao has also carried out modelling and simulation studies on the role of foreign assistance in developing economy and on the effects of international short-term capital movements on the national economies. He has been invited to present papers at the Third World Econometrics Congress at Ontario, Hamilton, Canada, in 1975 and the NBER conference on Stochastic Control at the University of Stan Ford at Palo Alto, USA in 1976.

Prof. Rao is a member of the board of studies in chemical engineering of Andhra and Panjab Universities. He has also assisted several other universities and organizations in different committees.

* * *

The following personnel of the Publications & Information Directorate, New Delhi, have been promoted consequent on five-year assessment : Shri Tenjarla C. S. Sastry (as Scientist C; 26 Feb. 1975); and Shri M. L. Sharma (as Scientist B; 25 July 1976).

* * *

The following personnel have been appointed at the National Chemical

Laboratory, Poona: Dr K. V. Datye (Visiting Scientist; 1 Sep. 1976); Dr V. B. Rele (Pool Officer; 1 Sep. 1976); Dr N. V. Badami (Pool Officer; 14 Oct. 1976); Dr V. H. Deshpande (Scientist B; 17 Sep. 1976); and Shri A. D. Mane (Horticultural Superintendent; 1 Sep. 1976).

* * *

The following personnel of the Central Salt & Marine Chemicals Research Institute, Bhavnagar, have been promoted as Scientist B: Dr R. M. Kava (12 Jan. 1977); Dr P. M. Oza (12 Jan. 1977); and Shri A. S. Mehta (13 Jan. 1977).

* * *

Shri A. B. Tarkunde and Shri H. S. Jagtap of the National Chemical Laboratory, Poona, have been promoted as Scientist B (2 Feb. 1977).

Honours

Shri S. Arunachalam of the Publications & Information Directorate, New Delhi, has been appointed a member of the editorial advisory board of *Current Contents/Physical & Chemical Sciences*, an international current awareness weekly published by the Institute for Scientific Information, Philadelphia, USA.

ATIRA's Eleventh Technological Conference

The eleventh technological conference of the Ahmedabad Textile Industry's Research Association (ATIRA), Ahmedabad, will be held on 5 & 6 April 1977 at ATIRA auditorium. The central theme of this conference will be 'Modernization and Renovation in the Textile Industry'.

The conference will discuss concepts, philosophies and criteria for modernization/renovation, including methods for undertaking a cost-benefit analysis. The choice of replacement versus renovation of machines will be considered with suitable examples. Priorities in modernization will also be discussed with specific examples. Papers will be presented by senior management people from industry and senior technologists of ATIRA.

Further details can be had from the Director, Ahmedabad Textile Industry's Research Association, Polytechnic P.O., Ahmedabad 380015.

Bulletin of Indian Raw Materials & their Utilization

To facilitate comprehensive coverage of original references on medicinal and aromatic plants and other raw materials, the Publications & Information Directorate, New Delhi, has decided to bring out from this year the Bulletin of Indian Raw Materials & their Utilization in two series : Series (A) dealing with current literature on medicinal and aromatic plants; and Series (B) dealing with current literature on other economic plants, and animal, mineral and industrial products.

These two series of this quarterly publication are now priced and will be available against an annual subscription of Rs 10 per series. Those interested may write to the Editor, Bulletin of Indian Raw Materials & their Utitization, Publications & Information Directorate, Hillside Road, New Delhi 110012. Payments may be made against 'Publications & Information Directorate (MAPIS) account'.

PATENTS FILED

Item No. 8 under 'Patents Filed' published in *CSIR News* 27 (1977), 16 should read as '23/Del/76 : Improvements in or relating to a process for hydrogenation of glucose, P.H. Brahme & R. P. Verma—NCL, Poona'.

Shanti Swarup Bhatnagar Prizes (1976) for Science and Technology

The second sentence of the second paragraph concerning the above item *[CSIR News 27* (1977), 40*]* should read as "Any citizen of India below the age of 45 years as on 31 December 1975 (*instead of* 31 December 1976)...."

COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH

Advertisement No. 8/77

It is proposed to appoint a Director for the Structural Engineering Research Centre.

Job Requirement : This is a top R & D management position in the field of structural engineering. The Director is expected to provide leadership in the identification and formulation of research and development projects and in coordinating research activities in accordance with the charter of the laboratory. The major areas of research at the Centre are structural analysis and design of reinforced concrete, prestressed concrete, steel and light metal structures, digital computation applied to structural analysis, prefabrication, experimental stress analysis, etc. The selected candidate is expected to have close rapport with user agencies. Apart from being an able and imaginative manager, he has to be an acknowledged leader of the profession with ability to project an effective image of the Centre.

Qualifications & Experience : High academic qualifications with established national and international standing and reputation and published work of high quality in any of the major areas of structural engineering. Adequate experience in planning and direction of research and transfer of technology is essential. Broad background knowledge and experience in areas of structural engineering and specialization and knowledge of modern techniques in selected areas are desirable.

Salary/Conditions of Service : The salary scale attached to the post is Rs 2500-125/2-3000. Initial pay will be fixed according to merits. The person selected will be appointed on contract for a period of 6 years which would be confirmed after an initial period of two years of satisfactory service. Other conditions of contract will be supplied on request.

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Scientists/technologists interested may obtain a standard proforma for sending their *curriculum vitae* from The Chief (Administration), Council of Scientific & Industrial Research, Rafi Marg, New Delhi 110 001. They can also obtain a brochure on the aims and objectives and the latest annual report of the centre. The completed *curriculum vitae* proforma must be received in this office on or before 5 May 1977.

Canvassing in any form and/or bringing in any influence, political or otherwise, will be treated as a disqualification for the post.

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